Avner Ben-Zaken, Cross-Cultural Scientific Exchanges in the Eastern Mediterranean, 1560-1660 (Baltimore: Johns Hopkins University Press, 2010)

AVNER BEN-ZAKEN. *Cross-Cultural Scientific Exchanges in the Eastern Mediterranean, 1560–1660*. Baltimore: Johns Hopkins University Press. 2010. Pp. 246. $60.00.

This finely textured book offers fresh and fascinating perspectives on the development of science in the early modern period. In five substantial chapters Avner Ben-Zaken indicates the extent of, and thereby establishes the importance of, cross-cultural exchanges between Christians and Muslims. Chapter one focuses on Taqī al-Dīn, who has been characterized as "the Tycho Brahe of the Ottoman Empire" (p. 9). Countering earlier claims of Taqī's purely Muslim provenance, the author shows that he gained expertise in astronomy from Christian and Jewish thinkers, at first in Italy and subsequently from a captured Italian Jewish astronomer. While showing the importance of the capture and exchange of prisoners between the West and the Ottoman Empire, this chapter also offers a very useful discussion of the role of apocalypticism in the encouragement of astronomy by kings and emperors (East and West).

Chapter two offers a new perspective on the Galileo affair, showing how attempts to find lost Holy Scriptures (in particular an early version of the Book of Job) were motivated by desires to vindicate Galileo through a scriptural endorsement of heliocentrism. The Galileo affair, therefore, "generated travels for the purposes of collecting ancient manuscripts of 'lost scriptures' " (p. 75). This broad theme is continued in chapter three in a discussion of Joseph Solomon Delmedigo, a Jewish student of Galileo who collected ancient Jewish manuscripts with a view to confirming Copernicanism.

Chapter four deals with the origins of English Orientalism through a highly nuanced study of John Greaves, Savilian Chair of Astronomy at Oxford, and founder of what is now called "pyramidology." The chapter is enhanced by the author's discussion of Greaves's conviction that the pre-Babel language had to be recovered in order to establish philosophical and religious truths. Ben-Zaken also analyzes the ideas of John Wilkins, who believed, like many others, in the possibility of a universal "natural" language that could be reconstructed by reason, rather than by historical scholarship. Chapter five provides another highly nuanced account of the background to the translation of Noël Duret's *Nouvelle théorie des planètes* into Arabic by an Ottoman scholar, Ibrāhīm Efendi al-Zigetvari. Here, the text is enriched by an exposition of the mystical Sufi element in al-Zigetvari's works. The author's fresh perspective will likely open up new areas of debate. I note, for example, a possible weakness in his claims about the importance of the Sufi concept of idrāk—"an intuitive mode of cognition, a direct knowledge of something, whether through sensation or intuition" (p. 148)—for al-Zigetvari's assessment of Copernicus. According to Ben-Zaken al-Zigetvari's evident refusal to see Copernicus as revolutionary in his astronomy derived from his commitment to idrāk, which led him to emphasise harmony in the history of astronomy. I know nothing of idrāk (or Sufism more widely) but I noticed that al-Zigetvari is quoted as saying: "Copernicus laid a new foundation and compiled small tables [of planetary movements] supposing that the Earth is in motion" (p. 155). This suggests that al-Zigetvari, like his source Noël Duret, simply assumed (as the majority of professional astronomers did) that Copernicus could not possibly have been serious about the motion of the Earth, but he merely "supposed" its motion for mathematical (not physical) reasons. In short, the

motion of the Earth was a mathematical trick, just like using the square root of minus one (an impossible number) to enable the solution of various algebraic expressions. From this perspective Copernicus never was a revolutionary; he was just another mathematician with a neat trick up his sleeve. I should like, therefore, a second opinion on the possible role of idrāk in al-Zigetvari's history of astronomy.

I do not intend to diminish Ben-Zaken's achievement. This is a serious, and remarkable, work of scholarship, and as such it very much deserves to be the starting point for further debate. In the meantime, this book has much to offer specialists of the early modern period. Although the main cast of characters consists of comparatively obscure thinkers, their minor roles in more significant movements ensures the importance of Ben-Zaken's scholarship. Certainly, this is a book that will need to be read by those interested in exchanges between science and the Abrahamic religions. Ben-Zaken is also alert to, and astute about, occult traditions in the thought of his protagonists. For those interested in the relations between magic and science, therefore, it should also be essential reading. Ben-Zaken does an excellent job of showing how and why the to and fro of information exchange, and of expertise, results not just in distortion but sometimes in embellishment or enhancement.

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